

## Performance Of Primary Collector Road Network Access For The Utilization Development Of Mosque In The Kendari Gulf Of Southeast Sulawesi

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**ABSTRACT:** Al-Alam Mosque and its supporting facilities under construction in the Kendari Gulf can encourage increased Traffic Volume on access to and out of vehicles on the primary collector road. Therefore it is necessary to study the performance of the road segment. This study investigated survey data and observational data on comparative buildings, as well as data from relevant agencies analyzed using the Indonesian Road Capacity Manual (IRCM). This research was conducted along the 200 m on the outlet of the vehicle to the Mosque in the Kendari Gulf. The results showed that the performance of the existing road was at the service level D which indicated the traffic flow began to be unstable, the speed was low and varied, the volume approached the capacity with the current degree of saturation of 0.82 is included in the category of values that are not in accordance with good road performance. Vehicle volume increased due to tug and rise of the Mosque Complex. The projection of service level after the mosque complex is utilized the primary collector road will be at level E indicating unstable, low and varying current as well as the volume approaching the standard capacity of Z.A Sugianto road with the degree of saturation which surpasses the good road performance standard of 0.93.

**KEYWORDS:** Road Performance, Service Level, Degree of Saturation, Traffic Impact

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### I. INTRODUCTION

Al Alam Mosque was built in the middle of the Kendari Gulf as an icon of worship of the Muslims of Southeast Sulawesi Province. Al-Alam Mosque Complex is expected to accommodate 6000 worshippers. The mosque uses three dome concepts namely Main Dome of Blooming Flower, Secondary Dome Shear Nabawi and Umbrella Tent. The mosque is designed, not only for places of worship but also the function of world-class water sport [1]. The construction began in 2010 and is targeted to be completed by the end of 2018. Al-Alam Mosque is a mosque on water Third After mosques in the kingdom of Morocco and Jeddah, Kingdom of Saudi Arabia (Said Agil Al Munawar) [1].

The rapid development, economy and population growth will result in the increasing needs of the community for transportation both in terms of facilities and transportation infrastructure in Kendari City. Based on data from the Central Bureau of Statistics (CBoS) of Southeast Sulawesi, the number of public transport vehicles and private vehicles reached 17.47% in 2016 in Kendari City. The amount of vehicle growth in Kendari City is dominated by motorcycles, the number of motorcycle growth increased by 16% from 2015 to 2016 [2].

One of the roads that often experience traffic congestion at this time is Z.A Sugianto road, the road is a collector road in Kendari city with four lane type two lane undivided (4/2 UD based on SK road of Kendari City No. 55 Year 2015). Along the Z.A Sugianto road there are several Activity Centers that can generate the rise and pull of traffic, such as office complex mayor, Kendari City General Hospital, restaurants, and housing complex Citra Land. Access to and exit of the Al-Alam Mosque building and its supporting facilities to build on the projected Z.A Sugianto road will generate a tug and a reversal of traffic movements that affect the increase in traffic volume.

A high level of movement and not followed by the development of the provision of transport facilities may result in traffic congestion, disrupting the smooth flow of traffic [3]. The problem is not in line with the road's benefit that the population can move safely, comfortably, quickly, orderly, regularly and efficiently in its territory [4].

This research aims to analyze the performance of the Z.A Sugianto road segment located at the Al-Alam Mosque Access at the moment, as well as to analyze the projected traffic volume that can be generated from the utilization of Al-Alam Mosque in the future.

**II. RESULTS AND DISCUSSION**

**Existing traffic volume**

Results of traffic volume analysis on Z.A Sugianto road. The maximum traffic volume occurred on Friday (figure 1), at 11.00-12.00 WITA for 2,597.95 pcu/hour. While the minimum traffic volume occurs on Friday at 12:00 am to 13:00 pm of 701.00 pcu/hour. Traffic volumes are affected by vehicle traffic activity during breaks and are heading to the mosque to perform Friday Prayers.

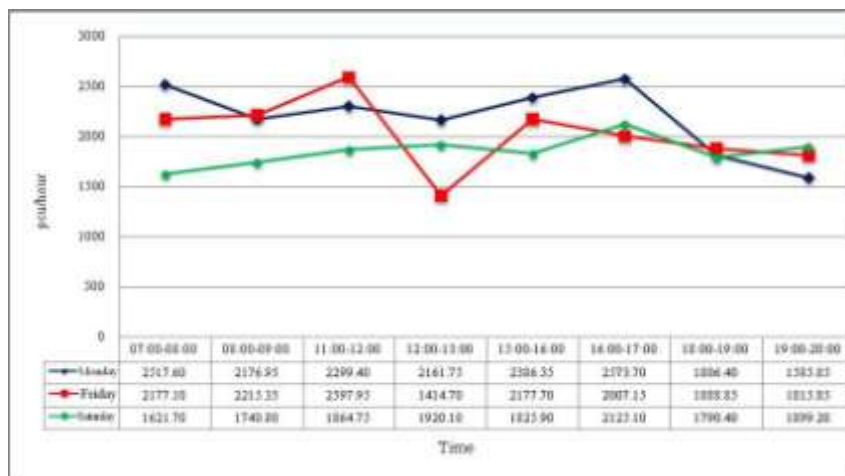


Figure 1. The traffic volume of Z.A. Sugianto roads existing

**Analysis of existing road capacity**

Changes in the value of road capacity are affected by the class from side obstacles, side obstacles such as on-street parking, private/public vehicles stopping at any place on the road, in and out vehicles and turning vehicles on U-Turn, have a higher impact than expected in the Manual Capacity of Indonesian Road [6]. The result of the calculation of existing road capacity with IRCM method [5] on the working day and the biggest Friday prayer day at 07.00 am to 09.00 am ie 3295 pcu/hour, and the smallest on Monday at 11.00 am to 12.00 am at 3066 pcu/h (figure 2) the existing road capacity is inadequate and is below the road capacity of Z.A Sugianto 3295 pcu/hour. The higher side barriers that occur in a road segment, the lower the capacity of the road and vice versa.

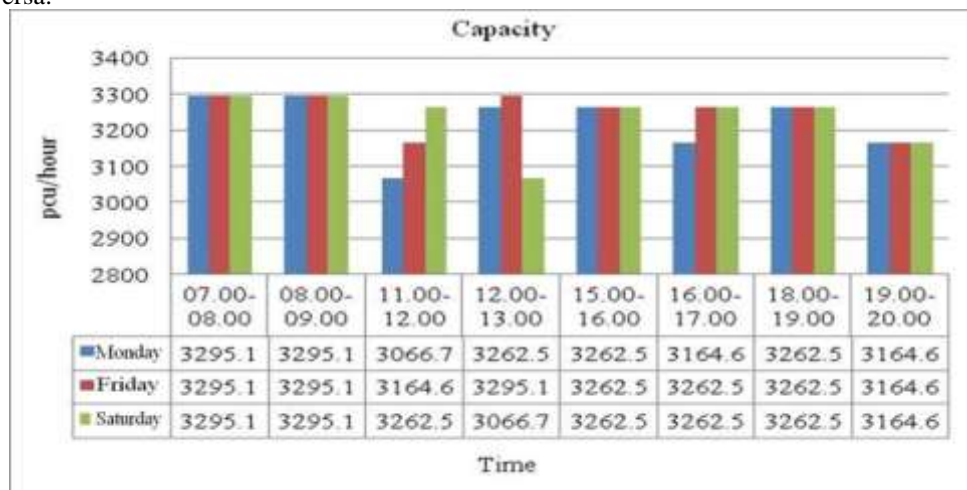


Figure 2. Existing Capacity Chart of Z.A Sugianto Road

**Analysis of Existing Saturation Degrees**

The greatest degree of saturation occurred on Fridays at 11:00 am to 12:00 am with a value of 0.82 (Table 1) is not in accordance with the limit of good road performance in accordance with IRCM of <0.75. The value of the degree of saturation according to Edward K Morlok [7] is at the level of road service D denotes unstable traffic flow, low speed and different, and volume approaches capacity.

**Table 1. Value of Road Saturation Degree of Z.A Sugianto**

Time	Degree of Saturation					
	Monday		Friday		Saturday	
07.00 am - 08.00 am	0.76	D	0.66	C	0.49	C
08.00 am - 09.00 am	0.66	C	0.67	C	0.53	C
11.00 am - 12.00 am	0.75	D	0.82	D	0.57	C
12.00 am - 13.00 pm	0.66	C	0.43	C	0.63	C
15.00 pm - 16.00 pm	0.73	C	0.67	C	0.56	C
16.00 pm -17.00 pm	0.81	D	0.62	C	0.65	C
18.00 pm - 19.00 pm	0.55	C	0.58	C	0.59	C
19.00 pm - 20.00 pm	0.50	C	0.57	C	0.60	C

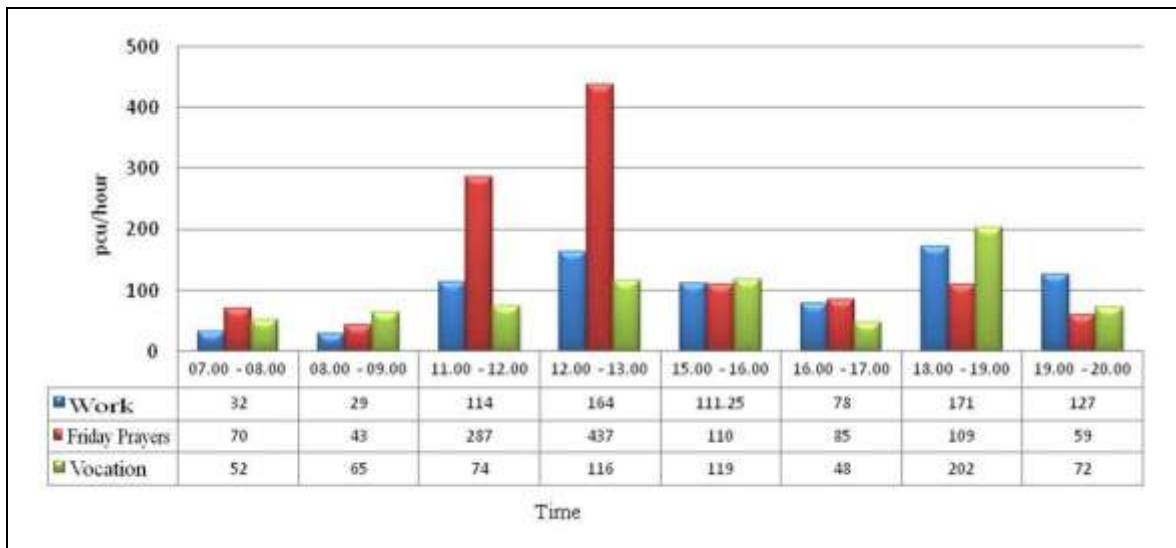
Source: Analysis Results, 2018

**Number of Vehicles Against Building Area**

The description of the volume of traffic on Z.A Sugianto road in Kendari City after the Al-Alam Mosque Complex functioned is obtained by first searching the amount of attraction and generated to be generated by the Al-Alam Mosque Complex. The traffic volume is obtained by comparing the building area and the amount of traction and generation [8] as seen in the following equation:

$$\text{Number of Pull and Generation of the Al - Alam Mosque Complex} = \frac{\text{Number of Pull and Generation of Al - Alam Mosque Complex} \times \text{Building Wide of Al - Alam Mosque Complex}}{\text{Building Mosque Alkautsar}}$$

Alkautsar Great Mosque in Kendari City was chosen as a comparison because it has the same characteristics with the Al-Alam Mosque Complex. So obtained the amount of attraction and the rise of vehicles Al-Alam Mosque Complex for working days, Friday prayer and holidays as shown in Figure 4.



**Figure 4. Projection of the pull and generation of vehicles of the Al-Alam Mosque Complex**

The amount of traffic volume increase on Friday in the event of Al-Alam mosque utilization, which will go through the largest Z.A Sugianto road at 12.00 am to 13.00 pm hours at 437.25 pcu/hour which will burden 13.5% of road capacity (Figure 3). This indicates that the visitation rate of the Al-Alam Mosque Complex will peak during Friday prayer hour which will affect the ratio of increasing traffic volume will impact on road capacity becomes inadequate.

### Traffic Space Capacity after Al-Alam Mosque Complex functioned

After obtaining the number of Tug and generation At the time of Al-Alam Masjid complex is functioned next will be calculated the capacity of Z.A Sugianto Road Capacity will decrease after adding the number of existing vehicles with the amount of tug and vehicle generated from the Al-Alam Mosque complex (Table 2).

**Table 2. Comparison of road capacity of Z.A Sugianto**

Time	Existing (pcu/hour)			After Al-Alam Mosque is functioned (pcu/hour)		
	Monday	Friday	Saturday	Monday	Friday	Saturday
07.00 am - 08.00 am	3295,1	3295,1	3295,1	3295,1	3262,5	3262,5
08.00 am - 09.00 am	3295,1	3295,1	3295,1	3295,1	3262,5	3262,5
11.00 am - 12.00 am	3066,8	3164,6	3262,5	3066,8	3101,3	3262,5
12.00 am - 13.00 pm	3262,5	3295,1	3066,8	3197,3	3099,4	3066,8
15.00 pm - 16.00 pm	3262,5	3262,5	3262,5	3262,5	3262,5	3197,3
16.00 pm - 17.00 pm	3164,6	3262,5	3262,5	3101,3	3262,5	3197,3
18.00 pm - 19.00 pm	3262,5	3262,5	3262,5	3197,3	3262,5	3197,3
19.00 pm - 20.00 pm	3164,6	3164,6	3164,6	3164,6	3164,6	3164,6

**Source:** Analysis Results, 2018

The change in the capacity of the Z.A Sugiantot enlarged road segment occurred on Friday representing the peak day of the Al-Alam Mosque complex, the change of roadside capacity occurred at noon at 11:00 am to 12:00 am at 3101.3 pcu/ hour and at 12.00 am to 13.00 pm for 3099, 4 pcu/ hour. The above capacity value is inadequate and is below the normal capacity of Z.A Sugianto 3295 pcu/hour.

Changes in road capacity caused by the increase in the number of vehicles passing through Z.A Sugianto road, especially the vehicles going to and leaving the Al-Alam Mosque Complex.

### Level of Service after Al-Alam Mosque Complex functioned

Comparison between existing saturation degree and after Al-Alam Mosque Complex functioned can be seen in Table 3. The highest degree of saturation still occurred on Friday representing the peak day of Al-Alam Mosque building use at 11.00 am to 12.00 am of 0.82 at the level service D increased to 0.93 at the level of erosion where the current is unstable, the speed is low and varies and the volume approaches the standard capacity of Z.A Sugianto road. The level of road service is not in accordance with the limit of good road performance in accordance with IRCM of 0.75.

**Table 3. Projected value of degree of saturation and level of service of existing road and after Al-Alam Mosque Complex functioned**

Time	Existing				Once Enabled							
	Monday		Friday		Saturday		Monday		Friday		Saturday	
	LOS	DS (Q/C)	LOS	DS (Q/C)	LOS	DS (Q/C)	LOS	DS (Q/C)	LOS	DS (Q/C)	LOS	DS (Q/C)
07.00 am	0,76	D	0,66	C	0,49	C	0,77	D	0,69	C	0,51	C
08.00 am	0,66	C	0,67	C	0,53	C	0,67	C	0,69	C	0,55	C
11.00 am	0,75	D	0,82	D	0,57	C	0,79	D	0,93	E	0,59	C
12.00 am	0,66	C	0,43	C	0,63	C	0,73	C	0,60	C	0,66	C
15.00 pm	0,73	C	0,67	C	0,56	C	0,77	D	0,70	C	0,61	C
16.00 pm	0,81	D	0,62	C	0,65	C	0,86	E	0,64	C	0,68	C
18.00 pm	0,55	C	0,58	C	0,59	C	0,62	C	0,61	C	0,62	C
19.00 pm	0,50	C	0,57	C	0,60	C	0,54	C	0,59	C	0,62	C

**Source:** Analysis Results, 2018

### III. CONCLUSION

The performance of Z.A Sugianto road located at the exit of the Al-Alam mosque complex is at the service level D which indicates the traffic flow starts unstable, the speed is low and varies, the volume approaches the capacity with the current saturation level of 0.82 that is included in the category of values that are not in accordance with good road performance of 0.75. The volume of vehicles increased due to the pull and generation of the Mosque Complex. The projected level of service after the mosque complex is utilized. The

primary collector road will be at level E indicating an unstable, low-speed and different current and volume approaching the standard capacity of Z.A Sugianto road with a degree of saturation that exceeds the good road performance standard of 0.93 .

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